

CLAIMS

I claim:

Sub A1 1. An adapter for converting a hammer tool into a multiple-impact object driving tool, the hammer tool having a housing with a barrel portion including a rear section and a nose section, a passage extending through the barrel portion with an opening in the nose section extending into the passage, the hammer tool having a reciprocating impact member being positioned in the passage, the adapter comprising:

a shroud for removably mounting on the hammer tool, the shroud having a forward end and a rearward end, a bore being formed through the upper shroud between the forward and rearward ends, the shroud having a rear portion located at the rearward end of the shroud for removably receiving a portion of the hammer device, the shroud having a front portion located forward of the rear portion;

a drive punch positioned in the bore of the shroud with a rear section for being impacted by the reciprocating impact member of the hammer tool and a forward end for impacting an object to be driven; and

a guide bushing extending forwardly from the shroud, the guide bushing having a forward end and a rearward end, a channel extending through the guide bushing between the forward and rearward ends for receiving a portion of the object to be driven, the guide bushing being slidably mounted on the front portion of the shroud such that the guide bushing is movable between an extended position and a retracted position.

2. The adapter of claim 1 wherein a lip is formed on the front portion of the shroud and extends inwardly into the bore, and an annular flange is formed on the guide bushing and extends radially outward from the guide bushing for retaining the guide bushing on the shroud.

Sub A2/ 3. The adapter of claim 1 additionally comprising an annular groove formed in an interior surface of the bore, and a securing ring removably mounted in annular groove in the bore.

4. The adapter of claim 1 additionally comprising a biasing means for biasing the guide bushing into an extended position with respect to the shroud.

5. The adapter of claim 4 wherein the biasing means comprises a compression spring positioned in the bore for pushing the guide bushing in a forward direction.

6. The adapter of claim 1 wherein an annular punch flange extends radially outwardly from the drive punch, the punch flange being positioned generally between the front and rear sections of the drive punch.

7. The adapter of claim 1 wherein the shroud has an outer surface, the outer surface of the shroud having a substantially cylindrical front part, a substantially frusta-conical intermediate part, and a substantially cylindrical rear part, a diameter of the rear part of the outer surface being relatively larger than a diameter of the front part of the outer surface.

Sub A3/ 8. The adapter of claim 1 additionally comprising a muffling means for muffling noise and vibration.

THE UNIVERSITY OF CHICAGO

a recess formed in the rear portion of the shroud, the recess extending between the bore of the shroud and an exterior of the shroud;

a locking ball positioned in the recess and being movable in the recess between a locked position in which the locking ball extends into the bore for engaging an exterior of a nose section of the hammer tool, and an unlocked position in which the locking ball is substantially completely retracted into the recess;

a lever movably positioned in the recess, the lever having a locked position in which the lever presses the locking ball into the locked position and an unlocked position in which the lever permits the locking ball to retract into the recess.

56 14. The adapter of claim 1 wherein an interior surface of the bore at the rear portion has interior threads formed thereon for threadedly engaging exterior threads on an exterior of a nose of the barrel portion of the hammer tool.

15. The adapter of claim 1 additionally comprising an extender assembly removably mounted on the shroud, the extender assembly including a collar extending about the shroud and an extender member pivotally mounted on the collar and extending forwardly past the forward end of the shroud and the forward end of the guide bushing, a foremost end of the extender member having a forked configuration for receiving a portion of a fastener to position the fastener as it extends into the channel of the guide bushing.

16. The adapter of claim 15 wherein the extender member comprises has two telescopic portions permitting adjustment of the

amount of forward extension of the foremost end of the extender member.

17. A multiple impact object driving system comprising:
a hammer tool for impacting an object, the hammer tool having a housing, the housing including a handle portion and a barrel portion mounted on the handle portion, the barrel portion having a rear section and a nose section, an outer surface of the nose section having a plurality of mounting threads, a passage extending through the barrel portion, an opening in the nose section extending into the passage, a reciprocating impact member being positioned in the passage; and
an adapter for converting a hammer tool into a multiple-impact object driving tool, the adapter being adapted for holding an object during the multiple impacts, the adapter comprising:
a shroud for removably mounting on the nose of the hammer tool, the shroud having a forward end and a rearward end, a bore being formed through the upper shroud between the forward and rearward ends;
the shroud having a rear portion removably mounted on the nose of the hammer (device), the rear portion being located at the rearward end of the shroud, an interior surface of the bore at the rear portion having interior threads formed thereon for threadedly engaging exterior threads on the nose of the hammer tool;
an annular interior shoulder being formed in the bore of the rear portion of the shroud;
the shroud having a front portion located forward of the rear portion and at the forward end of the shroud;

a lip formed on the shroud and extending inwardly into the bore, the lip being located adjacent to the forward end of the front portion of the shroud;

a guide bushing extending forwardly from the shroud, the guide bushing being slidably mounted on the front portion of the shroud, the guide bushing having a forward end and a rearward end, a channel extending through the guide bushing between the forward and rearward ends;

an annular flange on the guide bushing for retaining the guide bushing on the shroud, the annular flange being mounted on the rearward end of the guide bushing, the annular flange extending radially outward from the guide bushing;

a securing ring removably mounted in the bore, the securing ring being positioned in the bore substantially adjacent to a juncture of the front and rear portions of the shroud, an annular groove formed in an interior surface of the bore for receiving the securing ring in a manner preventing movement of the securing ring in the bore, the securing ring having an interior perimeter relatively smaller than a diameter of the bore in the shroud;

a ring member being positioned in the bore adjacent to the annular interior shoulder of the rear portion for abutting the nose section of the hammer tool;

a biasing means for biasing the guide bushing into an extended position with respect to the shroud, the biasing means comprising a compression spring positioned in the bore, the compression spring being located between the securing ring and the guide bushing for pushing the guide bushing away from the securing ring;

a drive punch positioned in the bore of the shroud, the drive punch having a rear section for being impacted by the reciprocating impact member of the hammer tool, the drive punch having a front section with a forward end for impacting an object to be driven, an annular punch flange extending radially outwardly from the drive punch, the punch flange being positioned generally between the front and rear sections of the drive punch, the punch flange being positioned adjacent to the securing ring;

wherein the shroud has an outer surface, the outer surface of the shroud having a substantially cylindrical front part, a substantially frusta-conical intermediate part, and a substantially cylindrical rear part, a diameter of the rear part of the outer surface being relatively larger than a diameter of the front part of the outer surface;

a muffling means for muffling noise and vibration, the muffling means comprising a muffler member mounted on the rear portion of the shroud, the muffler member having a bore in communication with the bore of the shroud, an annular space being formed about the bore of the muffler member, and a muffling material positioned in the annular space for absorbing vibration;

a magnetic member mounted on the guide bushing for facilitating holding of an object to be driven in the bushing, the magnetic member being located toward a front end of the guide bushing; and

retaining means on the rear portion of the shroud for retaining the shroud on the nose of the hammer tool.

¹⁸
~~16~~. The system of claim 15 wherein the retaining means includes:

06944009-083701

a longitudinal slit formed in the rear portion of the shroud and extending from the rearward end of the shroud toward the forward end; and

a pair of retaining tabs, each of the retaining tabs being mounted on the rear portion on a side of the longitudinal slit such that the retaining tabs are located on opposite sides of the longitudinal slit; and

a fastener for constricting the longitudinal slit, the fastener extending through each of the retaining tabs for pulling the retaining tabs together, the fastener being extending in holes in the retaining tabs, at least one of the holes being threaded for engaging threads on the fastener;

wherein a pair of fasteners is mounted on the retaining tabs.

19. The system of claim 15 wherein the retaining means includes:

a recess formed in the rear portion of the shroud, the recess extending between the bore of the shroud and an exterior of the shroud;

a locking ball positioned in the recess and being movable in the recess between a locked position in which the locking ball extends into the bore for engaging an exterior of the nose section of the hammer tool and an unlocked position in which the locking ball is substantially completely retracted into the recess;

a lever movably positioned in the recess, the lever having a locked position in which the lever presses the locking ball into the locked position and an unlocked position in which the lever permits the locking ball to retract into the recess;

a cap block mounted over the recess, the cap block holding the lever in the recess; and
a fastener holding the cap block on the shroud over the recess.

ADD A57

THE UNIVERSITY OF CHICAGO